A Comparison of the Role of Episodic Nutrient Supply on Pathways of Carbon in Upwelling Regimes

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Nutrient supply is episodic in the ocean even in regions of fairly high and continuous nutrient supply, such as coastal upwelling regimes. The structure of the ecosystem depends on nutrient availability and the different requirements of phytoplankton cells. For example, low silicate concentrations, while limiting the productivity of diatoms, will not constrain that of picoplankton. Nutrient supply depends on the upwelling intensity and frequency as well as on the nutrient concentration of the source water. A size-based model is used to address the effect of episodic upwelling and nutrient limitation on the pathways of carbon. Upwelling is estimated from NSCAT observations of wind and source water nutrient levels are taken from hydrographic climatology. The contribution of diatoms to community photosynthesis and carbon export is assessed. Periodic upwelling events are compared with realistic upwelling time series.